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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/581,468

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MASASHIGE SATO

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9963

7590

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EXAMINER

BLOUIN, MARK S

ART UNIT

PAPER NUMBER

2653

DATE MAILED: 03/19/2004

21

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/581,468

Applicant(s)

SATO ET AL.

Examiner

Mark Blouin

Art Unit

2653

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 05 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-14 and 16-18 is/are rejected.
- 7) ☒ Claim(s) 4 and 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## Detailed Action

### *Response to Amendment*

- Amended Claims 1 and 7 are acknowledged.
- The Office Action Summary incorrectly indicated the action as final and was examined as a Request for Continued Examination.

### *Claim Rejections – 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3,5, and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Fontana, Jr. et al. (USPN 5,898,547).
3. Regarding Claims 1 and 2, Fontana, Jr. et al. shows (Figs. 4 and 5) a magnetic sensor including a ferromagnetic tunnel junction (100) comprising a free layer (132) a magnetic direction of which freely rotates, a barrier layer formed (120+160) on the free layer, the barrier layer having a first region and a second region around the first region and the thickness of the barrier layer in the second region being greater than the thickness of the barrier layer in the first region, a region of the free layer corresponding to the first region functioning as a sensor portion for sensing an external magnetic field, wherein the barrier layer is formed by oxidizing the surface of a metal (aluminum oxide).

4. Regarding Claim 3, Fontana, Jr. et al. shows (Figs. 4 and 5) a magnetic sensor comprising a fixed layer (118) formed on the barrier layer (120+160), an anti-ferromagnetic layer (116) formed on the fixed layer (118) and fixing a magnetic direction of the fixed layer.

5. Regarding Claims 5 and 6, Fontana, Jr. et al. shows (Figs. 4 and 5) a magnetic head and magnetic encoder comprising the magnetic sensor. A magnetic head serves to encode data on recording media and thereby functions as a magnetic encoder.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 7-14 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fontana, Jr. et al. (USPN 5,898,547) in view of Fujishima et al. (JPN 07073419A).

8. Regarding Claims 7-14 and 17, Fontana, Jr. et al. shows (Figs. 1 and 2) a hard disk device comprising a magnetic head comprising a ferromagnetic tunnel junction element including a free layer (132) a magnetic direction of which freely rotates, and a fixed layer (118) is not exposed to the signal detection surface, which is opposed to one surface of the free layer through a barrier layer (120) and a magnetic direction of which is fixed by a anti-ferromagnetic layer (116) which is adjacent thereto, and shield layers (S1 and S2) of high permeability formed at both sides of the ferromagnetic, respectively, an end portion of free layer being extended from and projected from the ferromagnetic tunnel junction element (100) and an end portion of the free layer (132) being extended from and projected from the ferromagnetic tunnel junction element.

Fontana, Jr. et al does not show the end portion of the free layer being connected smoothly to a grounded member of high permeability being a shield layer spaced from the ferromagnetic tunnel junction element, the fixed layer is not exposed to the signal detection surface, neighboring the same, in a wider region spaced from a signal detection surface.

Fujishima et al shows the MR element (4) being connected smoothly to a grounded member of high permeability being a shield layer (6) spaced from the ferromagnetic tunnel junction element, neighboring the same, in a wider region spaced from a signal detection surface.

It would have been obvious to one of ordinary skill in the art to substitute the aforementioned features of the tunnel junction element of Fontana, Jr. et al. for the MR element of Fujishima et al. The rationale is as follows: One of ordinary skill in the art at the time of invention would have been motivated to to substitute the aforementioned features of the tunnel junction element of Fontana, Jr. et al. for the MR element of Fujishima et al in order to increase the yield of the MR head and prevent static electricity from discharging through the MR head.

9. Claims 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fontana, Jr. et al. (USPN 5,898,547).

10. Regarding Claim 16, Fontana, Jr. et al. shows the features of the magnetic head described above, however, does not show a ferromagnetic tunnel junction element further including another fixed layer which is opposed to the free layer, a magnetic direction of another fixed layer being fixed by another anti-ferromagnetic layer which is adjacent thereto. Official Notice is taken that dual ferromagnetic tunnel junction elements are old and well known in the art, therefore, it would have been obvious to one of ordinary skill in the art to combine the

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aforementioned features with the magnetic head of Fontana, Jr. et al. The rationale is as follows:

One of ordinary skill in the art at the time of invention would have been motivated to combine the dual ferromagnetic tunnel junction element with the magnetic head of Fontana, Jr. et al in order to provide more signal as there is spin dependent scattering on both sides of the free layer.

11. Regarding Claim 18, Fontana, Jr. et al shows the features of the magnetic head described above, however, does not show a disk array device comprising a plurality of hard disk devices. Official Notice is taken that disk array devices comprising a plurality of hard disk devices are old and well known in the art, therefore, it would have been obvious to one of ordinary skill in the art to combine the aforementioned features with the magnetic head of Fontana, Jr. et al. The rationale is as follows: One of ordinary skill in the art at the time of invention would have been motivated to combine the disk array device comprising a plurality of hard disk devices with the magnetic head of Gill in order to increase storage capacity.

***Allowable Subject Matter***

12. Claims 4 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

13. Applicant's arguments with respect to claims 1-18 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Blouin whose telephone number is (703) 305-5629. The examiner can normally be reached M-F, 6:00 am – 3:30 pm.


If attempts to reach the examiner by telephone are unsuccessful the examiner's supervisor, William Korzuch can be reached at (703) 305-6137. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9314 for regular and After Final communications.

Any inquiry of general nature or relating to the status of application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.

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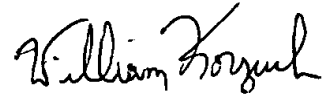
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Mark Blouin

Patent Examiner

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February 24, 2004



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SUPERVISORY PATENT EXAMINER  
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